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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,357	12/03/2003	Andrew Jay Skoog	13DV-13672 (07783-0086)	8999
31450 7590 10/24/2007 MCNEES WALLACE & NURICK LLC 100 PINE STREET P.O. BOX 1166 HARRISBURG, PA 17108-1166			EXAMINER TUROCY, DAVID P	
			ART UNIT 1792	PAPER NUMBER
			MAIL DATE 10/24/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/726,357	Applicant(s) SKOOG ET AL.	
	Examiner David Turocy	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/21/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 8/21/2007 has been entered.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 8/21/07 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Response to Amendment

3. The declaration under 37 CFR 1.132 filed 8/21/2007 is insufficient to overcome the rejection of claims as set forth in the last Office action because: the showing of unexpected results has been deemed not commensurate in scope with the present claims.

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- a. The showing of unexpected results are directed to a single type of component of gas turbine, however, the claims are direct to any component that has a ceramic outer layer.
- b. Additionally, the showing only discloses a showing of deposition of platinum/gold mixture or platinum alone as the reflective coating, however the claims are open to any number of reflective coatings. Therefore it is the examiners position that the applicants showing, platinum/gold mixture or platinum alone, is not a representative number of species to sufficiently establish that the shown results are applicable to the entire genus of "reflective coatings".
- c. The declaration fails to appreciate the deposited ceramic coating and merely discloses that a ceramic barrier coating is applied by air assisted spraying. However, the claims require applying any one of the seemingly expansive genus of ceramic coatings and the examiner can not determine from the declaration which ceramic material was deposited in the supplied testing.
- d. The applicant has argued the present claim results in enhanced inhibition of reflective coating to erosion, corrosion, and diffusion into the ceramic, however, such a statement has not been supported by any factual showing and therefore must be deemed mere speculation or opinion.
- e. The applicant has argued that the present reflective coating provide advantages versus the other application methods, see paragraph 4 of declaration, but has provided no factual showing or comparative showing and therefore must be deemed mere speculation or opinion.

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f. The tests run by the applicant, see paragraph 5 of declaration, discloses annealing to specific temperature, however, the claim is open to any number of temperatures, specifically, the claim merely requires firing to form a coating, and therefore the showing does not provide a representative number of the firing temperatures to support the entire genus within the claim as written. The examiner notes that the firing temperatures are 1400, 1650, 1800 °F, however the claims are open to any temperature. The showing is also not commensurate with claim 14, which discloses the narrowest range of firing temperatures, because the end points have not been shown as providing the argued benefits.

g. The test results also fail to appreciate the areal weight of either the ceramic coating or the reflective coating, and it is unclear whether the showing of unexpected results apply to all values of the areal weight of the two coatings, which is encompassed by the claim as written.

Response to Arguments

4. Applicant's arguments filed 8/21/2007 have been fully considered but they are not persuasive. Applicants arguments are discussed in section 3 above.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the

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subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al.

Nagaraj et al. teaches a method of applying a heat reflecting on a nickel-based superalloy component of a gas turbine engine by applying a ceramic thermal barrier coating onto the substrate by plasma spraying and then applying the heat reflecting layer of gold or platinum on the thermal barrier coating (Col. 3, line 26-Col. 4, line 24). It is the examiners position that the ceramic thermal barrier coating dries prior to application of the heat reflective coating. Nagaraj et al. does not teach the claimed method of applying the heat-reflecting layer. However, Nagaraj et al. teaches that the heat-reflecting layer can be applied by any conventional deposition technique (Col. 3, lines 49-57). Klabunde teaches forming a reflective metal layer, such as a gold or platinum layer, on a substrate by forming a dispersion of metal particles and organic solvent carrier, applying the dispersion to a substrate and then heating/firing to form the metal layer, where the dispersion can be applied by spraying (Col. 3, lines 35-65; Col. 6, lines 30-54).

Nagaraj et al. in view of Klabunde does not teach the spraying is an air assisted spraying technique. However, using air to atomize and project a spray for coating a gas turbine engines is well established in the art, as shown by Kirk-Othmer. (see page 672,

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Table 1, page 688, Table 2), and hence would have been an obvious method of spraying the heat-reflective coating because of the expectation of successfully forming the reflective layer.

It would have been obvious to one of ordinary skill at the time of the invention was made to apply the heat reflective layer of Nagaraj using conventional spraying as taught by Klabunde and specifically the conventional air-assisted spraying as disclosed by Kirk-Othmer because of the expectation of successfully applying the heat reflective layer on a gas turbine engine.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer do not teach the gas turbine engine having an outer ceramic layer. However, Nagaraj et al teaches a gas turbine engine part, while preferably formed from a nickel-based superalloy, can also be other suitable high temperature materials (Column 3, lines 29-31). Rigney et al teaching of a thermal barrier coating for a gas turbine engine discloses that deposition of a thermal barrier coating is advantageous to insulate a superalloy and/or ceramic substrate from high temperature.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer to use the ceramic substrate as suggested by Rigney et al to provide a desirable insulting coating because Rigney et al teaches both a superalloy and ceramic coating at known in the art to be subjected to high temperature environments.

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Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. does not teach the claimed amount of reflective coating mixture and thermal barrier coating applied to the substrate. However, it is the examiners position that the amount of these coatings applied to the turbine component are known result effective variables, as not enough of these coatings applied to the component would not provide the desired heat reflectance and thermal barrier properties, and too much would not offer additional benefits of increased heat reflectance and thermal properties.

Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to determine an optimal coating amount for the heat reflective layer and the thermal barrier layer, in the process of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al., through routine experimentation, to provide the desired heat reflecting and thermal barrier properties for the turbine component.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claim 6 above, and further in view of Vakil.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. does not teach the claimed thermal barrier layer material containing lanthanum or cerium. Vakil teaches a nickel-based superalloy gas turbine engine component having

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a ceramic thermal barrier coating, where the coating can include cerium (Col. 6, lines 1-25).

It would have been obvious to one skilled in the art at the time the invention was made to use the ceramic thermal barrier coating material of Vakil, including the cerium component, in the process of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. with the expectation of providing suitable thermal barrier properties, as shown by Vakil for nickel-based superalloy gas turbine engine components.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claim 6 above, and further in view of Eppler.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. does not teach that the ceramic thermal barrier coating is applied by air assisted spraying. However, Eppler teaches breaking down a ceramic into fine particles and air assisted spraying them onto a substrate (Page 955, Column 3).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. to use the air assisted spray technique suggested by Eppler to provide a desirable ceramic coating on a substrate Eppler teaches air-assisted spraying is known in the art to provide ceramic coatings onto a substrate.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claims 1 above, and further in view of Tecle.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. does not teach of providing a reflective-coating mixture with a noble metal encapsulator. Tecle teaches of a method for forming a palladium, silver, gold or platinum in an organic carrier (Column 3, lines 25-35). Tecle discloses utilizing an encapsulant material to limit the required amount of solvent (Column 4, lines 59-67). Tecle utilizes a metallic colloidal solution with fluxing agents to coat ceramics, metals, and ceramic/metal composites (Column 7, lines 10-31).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. to use a solution containing a metal encapsulant and fluxing agent as taught by Tecle to provide a desirable metallic coating because Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. teaches using a metallic pigment in an organic solvent for coating a surface and Tecle teaches a metal encapsulant reduces the large amount of solvent required when coating a ceramic or metal substrate and fluxing agents are provide enhanced adherence of a coating to a substrate.

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10. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claims 1 above, and further in view of Akechi.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. does not teach a reflective coating mixture containing a glass or ceramic comprising up to 25 wt% of the reflective mixture. Akechi teaches of using glass frit and noble metal dispersion in an organic vehicle to form a coating (Abstract). Akechi discloses using 1-3 wt % glass frit and 37-59 wt % noble metal powder in a 40-60 wt % organic vehicle (abstract). The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made if the overlapping portion of the range as disclosed by the reference were selected because overlapping ranges have been held to be prima facie case of obviousness. See *In re Wortheim* 191 USPQ 90.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. to use the glass frit/noble metal in an organic vehicle taught by Akechi to provide a desirable noble metal coating which experiences no deformation when coating.

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11. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claim 1 above, and further in view of Skoog et al.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. does not teach a firing temperature. Skoog et al. teaches of a gas turbine engine with a metal or a ceramic diffuse reflective barrier coating fired at a temperature between 800°F to 2500°F and more typically 1650°F (Column 10, lines 65-68).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. to use the firing temperature suggested by Skoog et al to provide a desirable firing of a reflective barrier coating because Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. teach of firing the barrier coating on a gas turbine engine part and Skoog et al. teaches of firing a barrier coating on a gas turbine engine is typically completed at 1650°F.

12. Claims 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., Eppler, Tecle, and Akechi as applied above, and further in view of Demaray.

Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., Eppler, Tecle, and Akechi teaches all the limitations of these claims as discussed

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above, except pre-treating the component surface prior to coating. Demaray teaches pretreating a component prior to application of a thermal barrier layer, in order to achieve a desired surface roughness (Col. 2, line 49-Col. 3, line 5). One skilled in the art would have recognized that such polishing/roughening is conventionally used for enhancing the adhesion of subsequently applied coatings to a substrate.

Therefore, it would have been obvious to one skilled in the art to pretreat the nickel-based superalloy component of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., Eppler, Tecle, and Akechi, prior to applying the coatings, in order to enhance the bonding of the coatings to the metal components, since polishing of superalloys prior to coating to enhance coating adhesion is disclosed by Demaray.

Conclusion

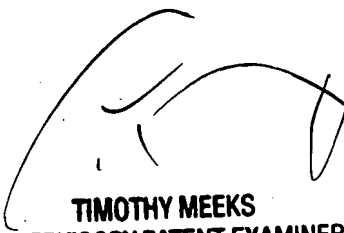
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Turocy/
Patent Examiner
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